

FEB 14 9 15 AM '01

February 14, 2001

Ms. Sharon Abbott
J.W. Sandri of Vermont, Inc.
PO Box 1578
Greenfield, MA 01301


RE: Site Investigation Report
Bob's Sunoco Service Station
13 Clinton Street, Springfield, Vermont
SMS Site #99-2960
2640

Dear Sharon:

Enclosed please find the above-referenced document, which includes a summary of all soil and groundwater sampling results. If you have any questions or comments, please call me at (802) 463-2200. Thanks.

Very truly yours,

TIGHE & BOND, INC.


Thomas R. Rigley, E.G.
Hydrogeologist

Enclosure

Cc: Chuck Schwer, VT DEC

S:\A311084\SIReport\CovLet.doc

SITE INVESTIGATION REPORT

VT SMS Site No. 992960
Bob's Sunoco Service Station
Springfield, Vermont

Prepared for:
J.W. Sandri of Vermont, Inc.
P.O. Box 1578
Greenfield, MA 01302

February 14, 2001

Tighe&Bond
Consulting Engineers
Environmental Specialists

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EXECUTIVE SUMMARY

Bob's Sunoco Service Station (the "site") is located at 13 Clinton Street, at the intersection of Clinton and South Streets, in Springfield, Vermont. According to the Town of Springfield's Tax Assessor's Cards, the 0.27-acre parcel contains one structure with an office and a garage. Municipal water and sanitary sewer systems serve the site and vicinity. The properties adjacent to the site consist of commercial and residential development. The Black River is located approximately 190 feet to the north of the site.

Between 1991 and 1999, J.W. Sandri of Vermont, Inc. (Sandri) have removed a total of five underground storage tanks (USTs) from the site. On December 20, 1991, a 550-gallon No. 2 fuel oil tank and a 550-gallon waste oil tank were removed. The associated UST Permanent Closure Form indicated that both USTs were in good condition and no evidence of a petroleum release was detected. In September 1999, Sandri removed three 6,000-gallon gasoline USTs and their associated components from the site. Soil samples collected from the UST grave, piping trench and dispenser island were screened for organic vapors with a PID. The PID readings ranged from 240 parts per million (ppm) to 1,034 ppm. Based on these findings, the Department of Environmental Conservation (DEC) and Sandri determined that additional assessment activities were necessary. A closure report, dated September 13, 1999, was prepared to document all information regarding the closure activities for the former gasoline UST system.

According to Sandri personnel, a petroleum release from the former gasoline UST system occurred in 1988. DEC was notified of the release by Sandri. Resulting remedial actions included the repair of failed UST piping and the installation of a 14-inch diameter groundwater recovery well. According to Sandri, no product (gasoline) was recovered from the well.

In June 2000, Tighe and Bond supervised the advancement of four on-site soil borings and the subsequent installation of monitoring wells as part of the required assessment activities described above. Soil samples were collected and screened with a PID for the presence of volatile organic compounds (VOCs). PID readings ranged from 0.0 ppm to 2000+ ppm. Groundwater samples were collected and analyzed for VOCs via EPA Method 8260 and total petroleum hydrocarbons (TPH) via EPA Method 8015M. Laboratory results indicated that benzene, toluene, ethylbenzene, methyl-tert-butylether (MTBE), 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected in groundwater at concentrations above the DEC Enforcement Standards (ESs) and Preventive Action Limits (PALs). Xylenes (total) were detected at concentrations that exceeded the xylene PAL, but not the xylene ES. Groundwater TPH results indicated the presence of dissolved gasoline in the carbon range of C₅-C₁₂ at a concentration of 31 ppm.

Based on the information presented in this report, both soil and groundwater have been impacted by a release of petroleum at the site. Since impacted soil remains in place, this poses a potential ongoing threat to groundwater quality. Unpaved portions of the site represent a direct soil contact risk to site workers. Drinking water supplies and indoor air in the site

vicinity do not appear to have been impacted by the release. Subsurface utility corridors and surface water in the site vicinity have the potential to have been impacted by the release.

An additional subsurface investigation is recommended to further evaluate the risks posed to sensitive receptors by the petroleum release and to further define the extent and degree of the release. Based on the results of the proposed investigation, recommendations regarding the need for additional investigation or corrective action may be provided. We further recommend that DEC approval should be requested prior to initiating any of the proposed activities.

1.0 SITE DESCRIPTION & HISTORY

This report summarizes the results of a site investigation conducted at Bob's Sunoco (the "site") located at 13 Clinton Street in Springfield, Vermont. Tighe & Bond was retained by J.W. Sandri, Inc. ("Sandri") of Greenfield, Massachusetts to perform a subsurface investigation that included the advancement of four on-site soil borings and the subsequent installation of monitoring wells, sampling of groundwater, and research regarding potential impacts to area receptors. The investigation was conducted in general accordance with a workscope prepared by Tighe & Bond dated May 18, 2000. The DEC approved this workscope in a letter dated June 15, 2000.

1.1 Site Description - According to the Town of Springfield's Tax Assessor's Cards, the parcel (Map 27, Block 3, Lot 40) occupies an area of approximately 12,000 square feet and contains one structure with an office and garage. The site is operated as an automobile service station. No petroleum products are sold to the public at this facility. The structure occupies an area of approximately 1,260 square feet.

A Site Locus is presented in Figure 1 showing the site at an elevation of approximately 358 feet above mean sea level. The area within approximately one-half mile of the site has a maximum relief of 400 feet with topography generally higher to the southwest. The Black River is located approximately 190 feet to the north of the site.

Municipal water and sanitary sewer systems serve the site and vicinity. The properties adjacent to the site are commercially developed to the north, east and west. To the south of the site is residential property. A list of abutting property owners and the corresponding tax maps illustrating these properties are included as Appendix A of this report.

1.2 Site History - According to Sandri, a petroleum release from a former on-site gasoline Underground Storage Tank (UST) system occurred in 1988. The source of this release was determined to have been from UST piping located in the southwest corner of the building. Upon discovery of the release, the DEC was notified by Sandri. Remedial actions included the repair of the failed UST piping and the installation of a 14-inch diameter groundwater recovery well. The installation of the recovery well was recommended by DEC in an effort to recover any gasoline that may have leached into the groundwater as a direct result of this release. However, Sandri reported that no gasoline was ever recovered in the well. No other abatement measures were enacted as a result of this release.

Between 1991 and 1999, Sandri supervised the closure of five USTs (Facility ID #83) including the former gasoline USTs. Removal and closure activities included a 550-gallon waste oil UST and a 550-gallon fuel oil UST that were completed in December 1991. In September 1999, three 6,000- gallon gasoline USTs were permanently closed. The following is a brief history relating to the closure of the five USTs:

- The two 550-gallon USTs were removed in December 1991. A UST Permanent Closure Form submitted by Sandri to DEC on December 24, 1991 indicated that the USTs were in

good condition. A HNU Model #HW-101 Photoionization Detector (PID) was used for on-site soil screening to assist in the detection of any petroleum releases. No releases were detected visually or with the PID.

- In December 1999, three 6,000-gallon gasoline USTs were permanently closed. A UST Permanent Closure report submitted by Sandri to DEC (September 13, 1999) described the USTs as being 28 years old. The report indicates that all three USTs (UST #1, UST #2, and UST #3) were in fair condition, although rust and pitting were observed. The associated piping was listed in good condition with rust present. During the closure activities, a Photovac Model #MP-1000 PID was used for on-site soil screening. According to the report, screening of composite soil samples from under each of the three tanks detected VOC concentrations ranging from 569 ppm to 1,034 ppm. Maximum PID readings were observed in a soil sample collected beneath UST #1. A soil sample collected from the piping trench near the southwest corner of the building had a VOC concentration of 300 ppm. PID readings observed in soil samples collected under the dispenser island were in the 240 ppm range.
- The 1999 closure report indicates that soils encountered during the excavation consisted of coarse sand to a depth of approximately 11 feet below grade. Neither groundwater nor bedrock was encountered in the excavation.
- Due to the high concentrations of VOCs detected in soil samples collected during the closure of the three gasoline USTs, Sandri recommended that an additional investigation should be conducted.

According to Sandri, no other USTs remain on the site. A Site Plan (Figure 2) illustrates the locations of all former USTs, the UST piping and the dispenser island.

2.0 SUBSURFACE EXPLORATIONS AND ANALYSES

2.1 Monitoring Well Installation - On June 29, 2000, Tighe & Bond supervised the advancement of four soil borings at the site and the subsequent installation of four monitoring wells (MW-1 through MW-4) in each boring. The locations of these soil borings/monitoring wells is shown in Figure 2. The wells were located where high PID readings were previously observed in soil samples collected during the September 1999 tank closure activities.

Soil borings were advanced by M & W Soils Engineering, Inc. of Charlestown, New Hampshire, using a hollow stem auger rig. Borings were advanced to depths ranging from 4 feet (MW-3) to 19 feet (MW-1), respectively. Refusal was encountered at all boring locations. Soils encountered during the advancement of the borings consisted primarily of brown/tan fine to medium sands with some silt and gravel.

Split spoon samples were collected in 2-foot increments every 5 feet with depth during the installation of monitoring wells MW-1, MW-2 and MW-4. Since auger refusal was encountered at a depth of four feet at boring location MW-3, no split-spoon sample was collected at this location. All soil samples were screened on-site for the presence of VOCs using a Photovac 2020 PID. Prior to screening the soils, the PID was calibrated to an isobutylene standard of 101.0 ppm with a response factor of 1.0. Since no split spoons were collected in MW-3, auger cuttings were collected and screened. The observed PID readings ranged from 1.6 ppm (MW-1) to 2,000+ ppm (MW-2). Background PID readings were in the range of 1.2 ppm to 1.9 ppm. Soil screening results and soil boring/monitoring well logs are presented in Appendix B.

The four monitoring wells were completed using two-inch diameter polyvinyl chloride (PVC) well materials. The annulus of each well was filled with clean sand to approximately 1 foot above the top of the well screen. Bentonite seals were placed above the sand packs, the remaining annuli were backfilled, and flush-mounted road boxes were installed at the ground surface. The wells were developed by hand bailing prior to departure from the site. Well development wastewater was discharged to the ground surface.

During monitoring well installation activities, the recovery well described in Section 1.2 was inspected. The well was observed to be damaged and in poor condition. Domestic trash and other debris partially filled the well.

2.2 Groundwater Sampling and Analysis - On July 12, 2000, Tighe & Bond personnel returned to the site and collected groundwater samples from the four monitoring wells. Depths to the water table were gauged in each monitoring well with an electronic water level meter prior to sampling. No free product was observed during well gauging activities.

After gauging, Tighe & Bond purged three well volumes of groundwater from each of the wells. Groundwater samples were collected from all wells and submitted on ice to Severn Trent Laboratories (STL) of Westfield, Massachusetts. The samples were analyzed for VOCs

and methyl-tert-butylether (MTBE) by EPA Method 8260B and total petroleum hydrocarbons (TPH) by EPA Method 8015M. A summary of all compounds detected in the groundwater samples, along with the corresponding DEC Enforcement Standards (ESs) and Preventive Action Levels (PALs) is presented in Table 1. A complete laboratory report for the July 12, 2000 sampling event is presented in Appendix C.

As shown on Table 1, benzene, toluene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected in monitoring wells MW-2 and MW-3 at concentrations that exceeded the applicable ESs. The laboratory also detected ethylbenzene in MW-2 and MTBE in MW-3 at concentrations that exceeded the applicable ESs. No other compounds were detected at concentrations exceeding the ESs.

Xylene was detected in monitoring wells MW-2 and MW-3 at concentrations below the xylene ES, but above the PAL. At monitoring wells MW-2 and MW-3, xylenes were detected at a concentration of 9,500 ppb and 9,400 ppb respectively. The applicable PAL for xylenes is 5,000 ppb.

TPH results indicated the presence of dissolved gasoline in the carbon range of C_5 - C_{12} in monitoring wells MW-2 and MW-3. Gasoline was detected at a concentration of 31 ppm in both monitoring wells. TPH was not detected in monitoring wells MW-1 or MW-4.

2.3 Site Geology - According to the *Surficial Geologic Map of Vermont*, (State of Vermont, 1969), surficial geology at the site consists of glaciolacustrine sand and gravel. This description is consistent with the types of overburden materials observed during the advancement of soil borings in June 2000. Published mapping (*Bedrock Geology of Vermont*, State of Vermont, 1961) indicates bedrock at the site consists of schists and phyllites of the Gile Mountain and West River Formations. Weathered schist was observed at the site in a split spoon sample collected from MW-2 at depths of 5 to 6 feet. The depth to bedrock observed in the soil borings ranged from approximately 4 feet to 19 feet.

2.4 Site Hydrogeology - On July 12, 2000, the monitoring wells were surveyed relative to an arbitrary benchmark at MW-3. The depth to the water table was measured in each on-site monitoring well. The depths to the water table ranged from 2.18 feet to 9.05 feet below ground surface. This data was used to plot the groundwater flow direction at the site. Figure 3 presents the relative groundwater elevations and an approximation of the groundwater flow direction on that date. Groundwater appears to flow to the northeast. The average hydraulic gradient across the site was calculated at approximately 0.09 ft/ft.

3.0 POTENTIAL RECEPTORS

As part of this investigation, potential receptors in the site vicinity were identified and the degree of risk posed by contamination to those receptors was assessed. The potential receptors included drinking water, groundwater, soil, indoor air and subsurface utilities.

3.1 Drinking Water – The Public Works Department indicated that there are no known private wells being operated within a 0.5-mile radius of this site and that the area is served by municipal water. The presence of a municipal water supply distribution system and the absence of private water supply wells in the site vicinity suggest that there is no significant risk posed to drinking water by the site release.

3.2 Groundwater – Analytical data from the groundwater sampling event in July 2000 showed that high concentrations of petroleum-related contaminants (benzene, toluene, ethylbenzene, xylenes, MTBE, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene) were detected in the site's groundwater. These results suggest that groundwater has been significantly impacted by a release or releases of petroleum from the gasoline UST system previously operated at the site. In addition, the presence of significant levels of soil contamination at and above the water table represents an ongoing threat to groundwater quality.

3.3 Soil – Petroleum-impacted soil was encountered during the September 1999 UST closure and during the June 2000 advancement of soil borings. The extent of the impacted soil has not been completely delineated. However, based on available PID data, impacted soil appears to be concentrated near the former gasoline piping, dispensers and USTs. Heavily impacted soils represent a potential threat to sensitive human/environmental receptors via direct contact and leaching. Based on current site usage, direct contact with the contaminated soil is unlikely once disturbed areas have been repaved.

3.4 Indoor Air – The site structure has slab-on-grade construction. PID analysis of indoor air at the service station on July 12, 2000 revealed organic vapor concentrations of up to 1.5 ppm. These concentrations may have resulted from ambient indoor air interferences and are not necessarily related to petroleum releases in the UST area. Access was not available to the multi-family residential dwelling located upgradient (south) of the site. The building located to the east of the site (Bond Auto Parts) does not have a basement and is not likely to have been impacted by the petroleum release due to its crossgradient location. Based on this data, it appears unlikely that the indoor air quality of the site structure or off-site structures is significantly threatened by the release.

3.5 Subsurface Utilities – Underground utilities at the site are limited to municipal water and sanitary sewer systems. The approximate locations of these utilities are illustrated on Figure 2. The utilities are located in petroleum-impacted areas of the site and also downgradient of those areas. These utilities may act as avenues for petroleum vapor or dissolved petroleum migration.

3.6 Surface Water – The partial USGS map included as Figure 1 indicates the Black River is located approximately 190 feet north of and downgradient from the site. The Black River drains into the Connecticut River approximately 3.4 miles from the site. Given the proximity of the Black River to the site and its location downgradient of the site, the Black River represents a potential receptor of groundwater impacted by the petroleum release.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations presented in this report are based solely on information obtained during the course of this investigation. Changes in site conditions, or information not available for review at the time of this investigation, may necessitate an update of these conclusions and recommendations.

4.1 Conclusions- Based on the results of this investigation, Tighe and Bond presents the following conclusions:

- A petroleum release was reported to have occurred at the site in 1988 due to the failure of the piping system associated with the former gasoline USTs. Although a recovery well was installed and operated, no petroleum was reported to have been recovered and the amount of petroleum released is unknown.
- Based on the UST closure information and soil sampling data summarized above, in-situ soils have been impacted by a petroleum release from the former gasoline UST system. The extent of the impacted soil has not been fully delineated. Heavily impacted soils are concentrated near the former tank pit, piping trench and dispenser island. Based on current site usage, direct contact with the contaminated soil is unlikely once disturbed areas have been repaved.
- Groundwater has also been impacted by the gasoline release. The extent of impacted groundwater has not been fully delineated. Several gasoline compounds, including benzene, are present at concentrations above their applicable ESs. High VOC concentrations in the soil above the water table represent an ongoing threat to groundwater quality.
- Drinking water supplies and indoor air do not appear to have been significantly impacted by the petroleum release. However, subsurface utilities (public water and sanitary sewer lines) may act as avenues for petroleum vapor or dissolved petroleum migration. The Black River is a potential receptor of groundwater impacted by the release.

4.2 Recommendations - Based on the above conclusions and in general accordance with current DEC guidelines, Tighe & Bond recommends the following:

- An additional subsurface investigation should be completed to further define the extent and degree of soil and groundwater contamination. The investigation should include the advancement of at least three soil borings and the installation of a monitoring well.

- The proposed locations of the borings/wells are as follows:

One at the downgradient property boundary (Clinton Street), one upgradient of the dispenser island and one at the southeast corner of the former gasoline UST area (Sandri has indicated that this portion of the UST grave appeared to have the highest concentration of residual petroleum).

- The recovery well should be emptied of all trash, fitted with a locking cover and developed to evaluate its potential for use as a monitoring or recovery point. If it cannot be adequately developed, the well should be properly abandoned without installing a locking cover.
- Given the high VOC concentrations observed in soil and groundwater, disturbed surface areas over the former gasoline UST system should be paved to prevent direct contact with petroleum-impacted soils.
- Confirmatory screening of indoor air on the site and adjacent properties (as available) should be conducted.
- Further evaluation of the potential for subsurface water and sewer lines to act as avenues for petroleum migration should be completed.
- The bank of the Black River located downgradient from the site should be inspected for signs of petroleum seepage. This information should be used in conjunction with groundwater sampling data from the proposed monitoring well on Clinton Street to assess potential impacts to the Black River.
- A full round of groundwater sampling should be conducted at all existing and proposed monitoring wells, and the recovery well, if appropriate. At a minimum, each sample should be analyzed for VOCs.
- Upon completion of the additional site investigation, a detailed report should be prepared outlining the extent and degree of contamination. The report should include recommendations for further work at the site, if needed. The corrective action should be assessed.

The above recommendations assume that the impacts and risks associated with the petroleum release have not been sufficiently evaluated, particularly with respect to soil, groundwater, surface water and subsurface utilities. Due to uncertainties inherent in any scientific investigation of this nature, DEC may have a different interpretation of the impacts and risks associated with the release. Consequently, we recommend that you seek DEC approval before you implement any of the recommended activities.

TABLES

TABLE 1
SUMMARY OF GROUNDWATER SAMPLING RESULTS
 Bob's Sunoco
 13 Clinton Street, Springfield, VT

Sample ID:	MW-1	MW-2	MW-6	MW-3	MW-4	Vermont Groundwater Quality Standards	
Sampling Date:	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	ES(µg/l)	PAL (µg/l)
EPA Method 8260B (µg/L)							
Benzene	ND>1	180	200	170	ND>1	5	0.5
Toluene	ND>1	6,300	6,060	2,300	ND>1	1,000	500
Ethylbenzene	ND>1	1,600	1,500	ND	ND>1	700	350
Xylenes (total)	ND>1	9,500	8,700	9,400	ND>1	10,000	5,000
Methyl-tert-butylether	5.8	ND>100	51J	53J	0.6J	40	20
Isopropylbenzene	ND>1	ND>100	ND (<1)	64J	ND>1	NSE	NSE
n-Propylbenzene	ND>1	110	100	220	ND>1	NSE	NSE
1,2,4-Trimethylbenzene	ND>1	2,400	2,500	5,700	ND>1	5	2.5
1,3,5-Trimethylbenzene	ND>1	690	680	2,000	ND>1	4	2
EPA Method 8015M (µg/L)							
Gasoline (C ₅ -C ₁₂)	NA	31,000	30,000	31,000	ND >0.5	NSE	NSE

Notes:

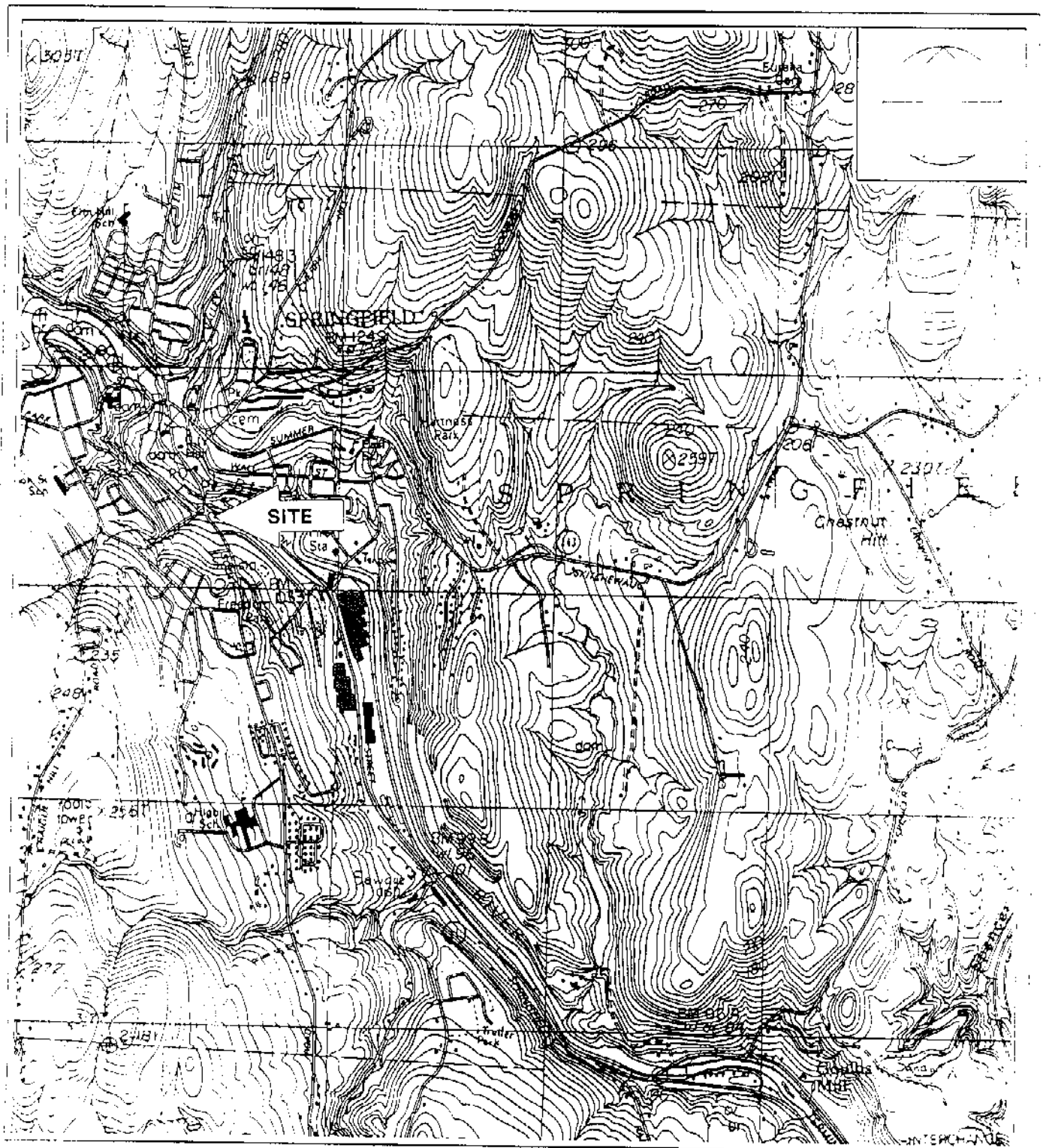
- (1) ES = Enforcement Standards, PAL = Preventive Action Levels, ug/l = micrograms per liter or parts per billion
- (2) EPA Method 8015M was analyzed for Gasoline Range Organics only
- (3) NSE = No Standard Established
- (4) ND>1 = Not detected above the laboratory quantitation limit shown
- (5) J = Indicates an estimated value.
- (6) MW-6 is field duplicate of MW-2
- (7) Only compounds detected in one or more samples shown above

FIGURES

FIGURE 1 - Site Locus

FIGURE 2 - Site Layout

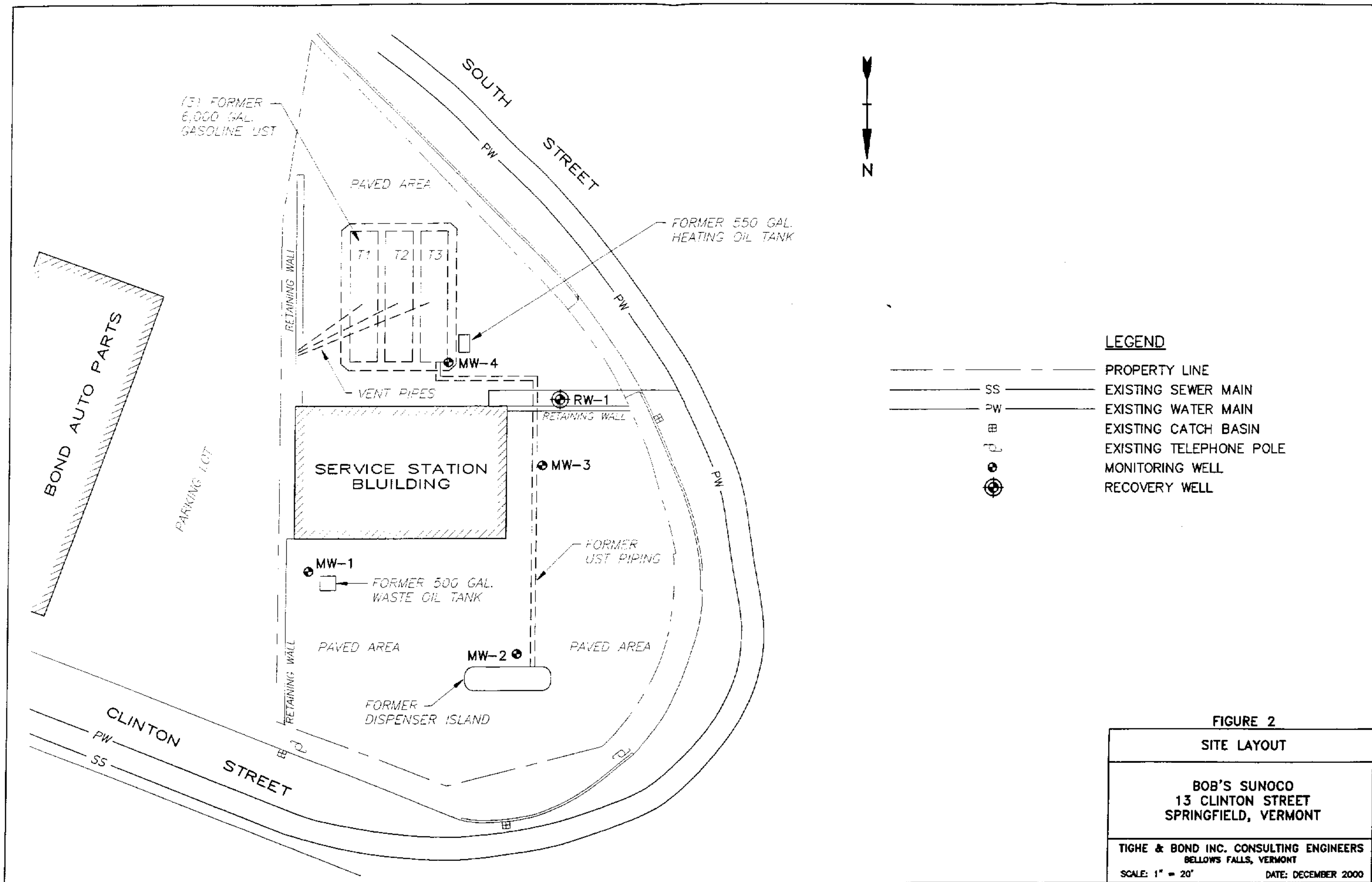
FIGURE 3 - Groundwater Flow Direction

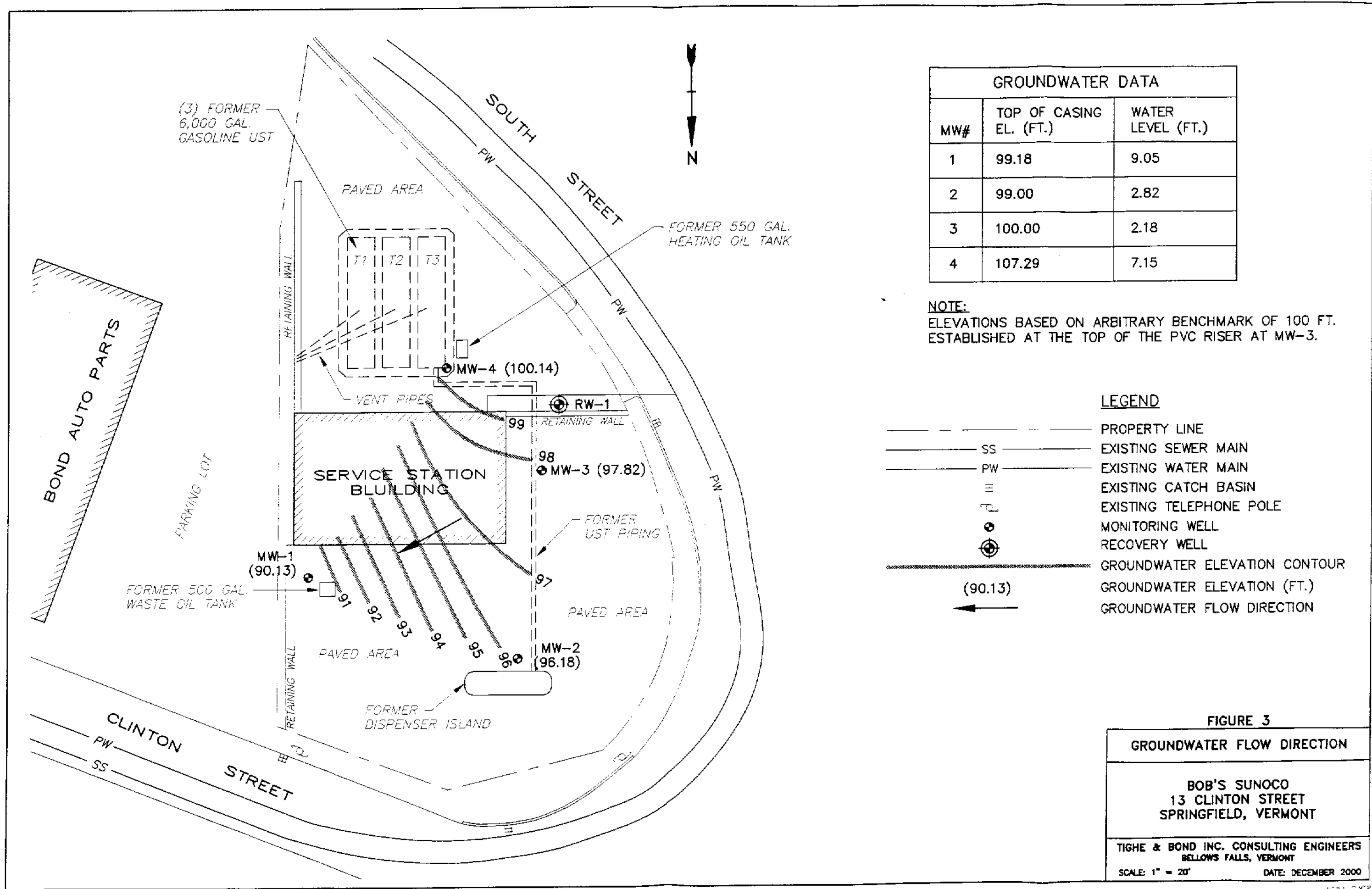


Site Locus

USGS Topographical Map
Springfield, VT Quadrangle
(1984)
1 : 25 000

Bob's Sunoco
13 Clinton Street
Springfield, Vermont
SMS Site #99-2960





APPENDICES

APPENDIX A – List of Adjacent Property Owners and Property Tax Map
APPENDIX B – Soil Boring/Monitoring Well Logs and Soil Screening Results
APPENDIX C – Groundwater Laboratory Reports

APPENDIX A

List of Adjacent Property Owners and Property Tax Map

**List of Adjacent Property Owners
Bob's Sunoco
Springfield, VT**

Direction	Map-Lot Number	Owner	Size of Lot	Property Type
Site	27-40	Rexbo Development PO Box 1578 Greenfield, MA	NL*	Commercial
Southeast	27-42	John Clafin 40 South Street Springfield, VT 05156	NL*	Residential
Southwest	27-61	Robert & Susan Beaudry 3227 Oak Brook Waxhaw, NC 28173	NL*	Commercial
West	26-54	Victor Dubanevich 23 South Street Springfield, VT 05156	NL*	Residential
North	26-39	Eugene P. Guy 15 Woolson Avenue Springfield, VT 05156	NL*	Commercial
Northwest	26-54	Springfield Housing Authority 1 Mineral Street Springfield, VT 05156	1.3	Commercial
East	27-41	FEB Reality 27 Morrison Road Barre, VT 05641	NL*	Commercial

NL* = Property Acreage not listed on Tax Map

APPENDIX B

Soil Boring/Monitoring Well Logs and Soil Screening Results

SHEET 1 OF 1
DATE 6/29/00
HOLE NO. MW-1
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		CASING		SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	HSA	SS	_____	DATE STARTED 6/29/00
		Size I. D. _____	4 1/4"	1 1/2"	_____	DATE COMPL. 6/29/00
		Hammer Wt. _____		140#	BIT	BORING FORMAN C.C. & W.M.
AT _____	AT _____ HOURS	Hammer Fall _____		30"	_____	INSPECTOR TOM
						SOILS ENGR.

[illegible]

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	summary
D-Dry C-Cored W-Washed	trace 0 to 10%	Cohesionless Density	EARTH BORING 19'5"
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	ROCK CORING
TP-Test Pit A-Auger V-Vane Test	some 20 to 35%	10-30 Med. Dense	SAMPLES 3
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	HOLE NO. MW-1
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	

SHEET	1	OF	1
DATE	6/29/00		
HOLE NO.	MW-2		
LINE & STA.			
OFFSET			

SURFACE ELEV.	
DATE STARTED	6/29/00
DATE COMPL.	6/29/00
WORKING FORMAN	C.C. & W.M.
INSPECTOR	TOM
POOLS ENGR.	

	CASING	SAMPLER	CORE BAR
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140 #	BIT
Hammer Fall		30"	

SURFACE ELEV.	
DATE STARTED	6/29/00
DATE COMPL.	6/29/00
BORING FORMAN	C.C. & W.M.
INSPECTOR	TOM
SOILS ENGR.	

[illegible]8-15 Stiff
15-20 M.D.M.

HOLE NO. MW - 2

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO TIGHE & BOND ADDRESS BELLOWS FALLS, VT
PROJECT NAME BOB'S SUNOCO LOCATION SPRINGFIELD, VT
REPORT SENT TO PAUL RENOUF PROJ. NO. _____
SAMPLES RETAINED BY TIGHE & BOND OUR JOB NO. 8191-00

SHEET 1 OF 1
DATE 6/29/00
HOLE NO. MW-3
LINE & STA. _____
OFFSET _____

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT _____	AT _____ HOURS	Type <u>HSA</u>	<u>SS</u>	DATE STARTED <u>6/29/00</u>	
AT _____	AT _____ HOURS	Size I. D. <u>4 1/4"</u>	<u>1 1/2"</u>	DATE COMPL. <u>6/29/00</u>	
		Hammer Wt. _____	<u>140 #</u>	BORING FORMAN <u>C.C. & W.M.</u>	
		Hammer Fall _____	<u>30"</u>	INSPECTOR <u>TOM</u>	
				SOILS ENGR.	

LOCATION OF BORING IN LOWER PARKING AREA - ACROSS STREET FROM DUBANEVICH'S STORE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6' on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
							NO	PEN	REC
5'						BROWN SANDY GRAVELS (STRONG GAS ODOR)			
					3'7"	REFUSAL TO AUGER - BEDROCK OR BOULDER			
						SET WELL AT 3'6"			
						SAND TO 1'			
						BENTONITE TO 10"			
						MATERIALS USED:			
						5' OF 2" PVC 0.010" SLOT SCREEN			
						5' OF 2" PVC SOLID			
						2# OF BENTONITE CHIPS			
						60# OF SAND			
						40# OF CEMENT MIX			
						1 ROAD BOX			
						2 EXPANSION CAPS			

GROUND SURFACE TO 3'7"

USED _____ CASING THEN _____

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	summary
D-Dry C-Cored W-Washed	trace 0 to 10%	Cohesionless Density	EARTH BORING 3'7"
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	ROCK CORING _____
TP-Test Pit A-Auger V-Vane Tes	some 20 to 35%	10-30 Med. Dense	SAMPLES 0
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	HOLE NO. <u>MW-3</u>
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO TIGHE & BOND ADDRESS BELLOWS FALLS, VT
PROJECT NAME BOB'S SUNOCO LOCATION SPRINGFIELD, VT
REPORT SENT TO PAUL RENOUF PROJ. NO.
SAMPLES RETAINED BY TIGHE & BOND OUR JOB NO. 8191-00

SHEET 1 OF 1
DATE 6/29/00
HOLE NO. MW-4
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT - AT - HOURS	Type	HSA	SS	DATE STARTED	6/29/00
	Size I. D.	4 1/4"	1 1/2"	DATE COMPL.	6/29/00
	Hammer Wt.		140#	BORING FORMAN	C.C. & W.M.
AT - AT - HOURS	Hammer Fall		30"	INSPECTOR	TOM
				SOILS ENGR.	

LOCATION OF BORING IN EXCAVATION AREA OF OLD UST'S, BEHIND BUILDING ON HILL

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
							NO.	PEN	REC
5'				LOOSE	6'	BROWN SANDY GRAVELS (FILL)			
	5' - 7'	SS	1 2						
			2 1						
10'				LOOSE	11'6"	BROWN AND GREY FINE SILTY SAND			
	10' - 12'	SS	3 5						
			16 21				2	24"	21"
15'				LOOSE TO DENSE - WET	13'5"	BROWN GRAVELLY SAND AND SILT WITH WEATHERED ROCK REFUSAL TO AUGER - BEDROCK OR BOULDER			
						SET WELL AT 13'2" SAND TO 3'4" BENTONITE TO 2'9"			
						MATERIALS USED: 10' OF 2" PVC 0.010" SLOT SCREEN 10' OF 2" PVC SOLID 25# OF BENTONITE CHIPS 200# OF SAND 40# OF CEMENT MIX 1 ROAD BOX 1 SLIDE CAP			

GROUND SURFACE TO 13'5"

USED CASING THEN

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	summary
D-Dry C-Corod W-Washed	trace 0 to 10%	Cohesionless Density	EARTH BORING 13'5"
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	ROCK CORING
TP-Test Pit A-Auger V-Vane Tes	some 20 to 35%	10-30 Med. Dense	SAMPLES 2
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	HOLE NO. MW-4
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Still	
		8-15 Stiff	
		15-30 V-Stiff	

SOIL SCREENING RESULTS - JUNE 29, 2000

Bob's Sunoco
13 Clinton Street
Springfield, VT

Depth (ft)	PID Readings (ppm)			
	MW-1	MW-2	MW-3	MW-4
2	NS	2000+	387	NS
3	NS	NS	1,987	NS
5-7	1.6	60	NS	14.2
10-12	0.0	NS	NS	18.6
15-17	0.0	NS	NS	NS

Notes:

- (1) Soils were screened in the field using the headspace method with a Photovac 2020 Ionization Detector (PID). The PID was calibrated to an isobutylene standard of 101 parts per million (ppm) with a response factor of 1.0.
- (2) 2000+ indicates maximum detection limit of PID
- (3) NS=No sample collected

F:\v1084\Tables\PIDsumm.xls

APPENDIX C

Groundwater Laboratory Report

**SEVERN
TRENT
SERVICES**

STL Westfield

Westfield Executive Park
53 Southampton Road
Westfield, MA 01085

Tel: 413 572 4000
Fax: 413 572 3707
www.stl-inc.com

July 25, 2000

Mr. Tom Rigley

Tighe & Bond, Inc. V1084
25 Village Square

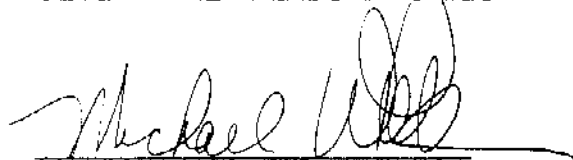
Bellows Falls, VT 05108

Report Number : 23414

Dear Mr. Rigley,

The analysis of your sample(s) submitted on 7/13/00 is now complete and the appropriate analytical report is enclosed. The samples were prepared and analyzed according to EPA established methodologies and protocols. If you have any questions regarding the report or any part of our service, please do not hesitate to contact us. Thank you for using Severn Trent Laboratories, and we look forward to receiving your next samples.

SEVERN TRENT LABORATORIES

A handwritten signature in black ink, appearing to read "Michael Wheeler", is written over a horizontal line.

Michael F. Wheeler, Ph.D.

Laboratory Director

SEVERN TRENT LABORATORIES (MA)

DATA REPORTING QUALIFIERS AND TERMINOLOGY

A number of data qualifiers are widely used within the environmental testing industry and may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP).

ORGANIC QUALIFIERS

- U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.
- J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified quantitation limit but no less than one-half the quantitation limit.
- B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte. Common laboratory contaminants in applicable method blanks are reported with J qualifiers to one-tenth the quantitation limit.
- E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.
- D - Indicates all compounds identified in an analysis at a secondary dilution factor.
- RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.
- RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

INORGANICS

- U - Indicates that the analyte was analyzed for but not detected.
- E - Indicates an estimated value because of the presence of interference.

RPO00100.MA

**SEVERN
TRENT
SERVICES**

MADEP MA014
RIDOH57
CTDPH 0494
NY DOH 10843
NH DES 2539

149 Rangeway Rd.
N. Billerica, MA 01862
Tel: (978) 667-1400
Fax: (978) 667-7871

53 Southampton Rd.
Westfield, MA 01085
Tel: (413) 572-4001
Fax: (413) 572-5701

SEVERN TRENT LABORATORIES (MA)
DATA REPORTING QUALIFIERS AND TERMINOLOGY

In addition to our standard data reporting qualifiers the following comments are specific to Total Petroleum Hydrocarbons, (Diesel or Gasoline Range Organics) by GC/FID.

PETROLEUM HYDROCARBON QUALIFIERS

Results for Motor Oil are based on chromatographable portions of the petroleum product.

The Carbon Range refers to the approximate chromatographic region covered by the specified petroleum product in straight-chain carbon units.

Quantitation is based on the average response factors for a series of hydrocarbon standards. The sample result from the DRO fraction is independent of the target compound assignment.

Target compound assignments for unknown positives (match quality 4) are based on retention time only.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : MW-1
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 5 mL
% Solid :
Dilution Factor : 1

Report No : 23414
STL Sample Number : 152132
Lab File ID : G6405.D
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/20/00
By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	0.5	U

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : MW-2
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 5 mL
% Solid :
Dilution Factor : 20

Report No : 23414
STL Sample Number : 152133
Lab File ID : G6411.D
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/20/00
By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	10	31 (2)

Sample Carbon Range: C5-C12

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : MW-3
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 5 mL
% Solid :
Dilution Factor : 20

Report No : 23414
STL Sample Number : 152134
Lab File ID : G6416.D
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/21/00
By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	10	31 (2)

Sample Carbon Range: C5-C12

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : MW-4
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 5 mL
% Solid :
Dilution Factor : 1

Report No : 23414
STL Sample Number : 152135
Lab File ID : G6408.D
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/20/00
By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	0.5	U

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : MW-6

Client Name : Tighe & Bond, Inc. V1084

Project Name : Bobs Sunoco

Matrix : Other

Sample Wt/Vol : 5 mL

% Solid :

Dilution Factor : 10

Report No : 23414

STL Sample Number : 152136

Lab File ID : G6417.D

Date Collected : 7/12/00

Date Received : 7/13/00

Date Analyzed : 7/21/00

By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	5.0	30 (2)

Sample Carbon Range: C5-C12

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

GC Organics Analysis GRO Data Sheet

SW8468015M

Client ID : TB-2
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 5 mL
% Solid :
Dilution Factor : 10

Report No : 23414
STL Sample Number : 152137
Lab File ID : G6410.D
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/20/00
By : LB

CAS NO	Compound	Quantitation Limit mg/L	Concentration mg/L
	Gasoline (C5-C12)	0.5	U

Match Quality Scale :

- 1 - Identical or nearly identical GC pattern
- 2 - Similar GC pattern showing moderate differences
- 3 - Significant difference in GC pattern
- 4 - No agreement with GC patterns in target list.

Quantitation based on petroleum product with similar Cn range.

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-1
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25 mL
 % Solid :
 Dilution Factor : 1

Report No : 23414
 STL Sample Number : 152126
 Lab File ID : V39307
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/21/00
 By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	10	U
108-86-1	Bromobenzene	1.0	U
71-43-2	Benzene	1.0	U
75-27-4	Bromodichloromethane	1.0	U
74-97-5	Bromochloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	2.0	U
78-93-3	2-Butanone	10	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
124-48-1	Chlorodibromomethane	1.0	U
75-00-3	Chloroethane	2.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	2.0	U
95-49-8	2-Chlorotoluene	1.0	U
106-43-4	4-Chlorotoluene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
74-95-3	Dibromomethane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
142-28-9	1,3-Dichloropropane	1.0	U
590-20-7	2,2-Dichloropropane	1.0	U
563-58-6	1,1-Dichloropropene	1.0	U
10061-01-5	cis-1,3-Dichloropropene	0.5	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-1

Client Name : Tighe & Bond, Inc. V1084

Project Name : Bobs Sunoco

Matrix : Groundwater

Sample Wt/Vol : 25 mL

% Solid :

Dilution Factor : 1

Report No : 23414

STL Sample Number : 152126

Lab File ID : V39307

Date Collected : 7/12/00

Date Received : 7/13/00

Date Analyzed : 7/21/00

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
10061-02-6	trans-1,3-Dichloropropene	0.5	U
100-41-4	Ethylbenzene	1.0	U
106-93-4	Ethylenedibromide	1.0	U
75-69-4	Fluorotrichloromethane	1.0	U
591-78-6	2-Hexanone	10	U
87-68-3	Hexachlorobutadiene	0.6	U
98-82-8	Isopropylbenzene	1.0	U
108-10-1	4-Methyl-2-pentanone	10	U
75-09-2	Methylene chloride	1.0	U
1634-04-4	Methyl-t-butylether	1.0	5.8
104-51-8	n-Butylbenzene	1.0	U
103-65-1	n-Propylbenzene	1.0	U
91-20-3	Naphthalene	5.0	U
108-38-3/106-42	m+p-Xylene	1.0	U
99-87-6	p-Isopropyltoluene	1.0	U
95-47-6	o-Xylene	1.0	U
135-98-8	sec-Butylbenzene	1.0	U
100-42-5	Styrene	1.0	U
98-06-8	tert-Butylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
108-88-3	Toluene	1.0	U
87-61-6	1,2,3-Trichlorobenzene	1.0	U
120-82-1	1,2,4-Trichlorobenzene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
95-63-6	1,2,4-Trimethylbenzene	1.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-1
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Groundwater
Sample Wt/Vol : 25 mL
% Solid :
Dilution Factor : 1

Report No : 23414
STL Sample Number : 152126
Lab File ID : V39307
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/21/00
By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
75-01-4	Vinyl chloride	2.0	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-2
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25mL
 % Solid :
 Dilution Factor : 100

Report No : 23414
 STL Sample Number : 152127
 Lab File ID : V39309
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/21/00
 By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	1,000	U
108-86-1	Bromobenzene	100	U
71-43-2	Benzene	100	180
75-27-4	Bromodichloromethane	100	U
74-97-5	Bromochloromethane	100	U
75-25-2	Bromoform	100	U
74-83-9	Bromomethane	200	U
78-93-3	2-Butanone	1,000	U
56-23-5	Carbon tetrachloride	100	U
108-90-7	Chlorobenzene	100	U
124-48-1	Chlorodibromomethane	100	U
75-00-3	Chloroethane	200	U
67-66-3	Chloroform	100	U
74-87-3	Chloromethane	200	U
95-49-8	2-Chlorotoluene	100	U
106-43-4	4-Chlorotoluene	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
156-60-5	trans-1,2-Dichloroethene	100	U
74-95-3	Dibromomethane	100	U
96-12-8	1,2-Dibromo-3-chloropropane	100	U
95-50-1	1,2-Dichlorobenzene	100	U
541-73-1	1,3-Dichlorobenzene	100	U
106-46-7	1,4-Dichlorobenzene	100	U
75-34-3	1,1-Dichloroethane	100	U
107-06-2	1,2-Dichloroethane	100	U
75-35-4	1,1-Dichloroethene	100	U
78-87-5	1,2-Dichloropropane	100	U
142-28-9	1,3-Dichloropropane	100	U
590-20-7	2,2-Dichloropropane	100	U
563-58-6	1,1-Dichloropropene	100	U
10061-01-5	cis-1,3-Dichloropropene	50	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-2
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25mL
 % Solid :
 Dilution Factor : 100

Report No : 23414
 STL Sample Number : 152127
 Lab File ID : V39309
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/21/00
 By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
10061-02-6	trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	100	1600
106-93-4	Ethylenedibromide	100	U
75-69-4	Fluorotrichloromethane	100	U
591-78-6	2-Hexanone	1,000	U
87-68-3	Hexachlorobutadiene	60	U
98-82-8	Isopropylbenzene	100	U
108-10-1	4-Methyl-2-pentanone	1,000	U
75-09-2	Methylene chloride	100	U
1634-04-4	Methyl-t-butylether	100	U
104-51-8	n-Butylbenzene	100	U
103-65-1	n-Propylbenzene	100	110
91-20-3	Naphthalene	500	U
108-38-3/106-42	m+p-Xylene	100	8000
99-87-6	p-Isopropyltoluene	100	U
95-47-6	o-Xylene	100	1500
135-98-8	sec-Butylbenzene	100	U
100-42-5	Styrene	100	U
98-06-6	tert-Butylbenzene	100	U
127-18-4	Tetrachloroethene	100	U
630-20-6	1,1,1,2-Tetrachloroethane	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	6300
87-61-6	1,2,3-Trichlorobenzene	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U
71-55-6	1,1,1-Trichloroethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
79-01-6	Trichloroethene	100	U
96-18-4	1,2,3-Trichloropropane	100	U
95-63-6	1,2,4-Trimethylbenzene	100	2400
108-67-8	1,3,5-Trimethylbenzene	100	690

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-2
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Groundwater
Sample Wt/Vol : 25mL
% Solid :
Dilution Factor : 100

Report No : 23414
STL Sample Number : 152127
Lab File ID : V39309
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/21/00
By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
75-01-4	Vinyl chloride	200	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-3

Report No : 23414

Client Name : Tighe & Bond, Inc. V1084

STL Sample Number : 152128

Project Name : Bobs Sunoco

Lab File ID : V39311

Matrix : Groundwater

Date Collected : 7/12/00

Sample Wt/Vol : 25mL

Date Received : 7/13/00

% Solid :

Date Analyzed : 7/22/00

Dilution Factor : 100

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	1,000	U
108-86-1	Bromobenzene	100	U
71-43-2	Benzene	100	170
75-27-4	Bromodichloromethane	100	U
74-97-5	Bromochloromethane	100	U
75-25-2	Bromoform	100	U
74-83-9	Bromomethane	200	U
78-93-3	2-Butanone	1,000	U
56-23-5	Carbon tetrachloride	100	U
108-90-7	Chlorobenzene	100	U
124-48-1	Chlorodibromomethane	100	U
75-00-3	Chloroethane	200	U
67-66-3	Chloroform	100	U
74-87-3	Chloromethane	200	U
95-49-8	2-Chlorotoluene	100	U
106-43-4	4-Chlorotoluene	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
156-60-5	trans-1,2-Dichloroethene	100	U
74-95-3	Dibromomethane	100	U
96-12-8	1,2-Dibromo-3-chloropropane	100	U
95-50-1	1,2-Dichlorobenzene	100	U
541-73-1	1,3-Dichlorobenzene	100	U
106-46-7	1,4-Dichlorobenzene	100	U
75-34-3	1,1-Dichloroethane	100	U
107-06-2	1,2-Dichloroethane	100	U
75-35-4	1,1-Dichloroethene	100	U
78-87-5	1,2-Dichloropropane	100	U
142-28-9	1,3-Dichloropropane	100	U
590-20-7	2,2-Dichloropropane	100	U
563-58-6	1,1-Dichloropropene	100	U
10061-01-5	cis-1,3-Dichloropropene	50	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-3
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25mL
 % Solid :
 Dilution Factor : 100

Report No : 23414
 STL Sample Number : 152128
 Lab File ID : V39311
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/22/00
 By : GJB

CAS NO	Compound	Quantitation Limit	Concentration
		ug/L	ug/L
10061-02-6	trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	100	300
106-93-4	Ethylenedibromide	100	U
75-69-4	Fluorotrichloromethane	100	U
591-78-6	2-Hexanone	1,000	U
87-68-3	Hexachlorobutadiene	60	U
98-82-8	Isopropylbenzene	100	64 J
108-10-1	4-Methyl-2-pentanone	1,000	U
75-09-2	Methylene chloride	100	U
1634-04-4	Methyl-t-butylether	100	53 J
104-51-8	n-Butylbenzene	100	U
103-65-1	n-Propylbenzene	100	220
91-20-3	Naphthalene	500	U
108-38-3/106-42	m+p-Xylene	100	7200
99-87-6	p-Isopropyltoluene	100	U
95-47-6	o-Xylene	100	2200
135-98-8	sec-Butylbenzene	100	U
100-42-5	Styrene	100	U
98-06-6	tert-Butylbenzene	100	U
127-18-4	Tetrachloroethene	100	U
630-20-6	1,1,1,2-Tetrachloroethane	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	2300
87-61-6	1,2,3-Trichlorobenzene	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U
71-55-6	1,1,1-Trichloroethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
79-01-6	Trichloroethene	100	U
96-18-4	1,2,3-Trichloropropane	100	U
95-63-6	1,2,4-Trimethylbenzene	100	5700
108-67-8	1,3,5-Trimethylbenzene	100	2000

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-3
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Groundwater
Sample Wt/Vol : 25mL
% Solid :
Dilution Factor : 100

Report No : 23414
STL Sample Number : 152128
Lab File ID : V39311
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/22/00
By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
75-01-4	Vinyl chloride	200	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-4
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25 mL
 % Solid :
 Dilution Factor : 1

Report No : 23414
 STL Sample Number : 152129
 Lab File ID : V39308
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/21/00
 By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	10	U
108-86-1	Bromobenzene	1.0	U
71-43-2	Benzene	1.0	U
75-27-4	Bromodichloromethane	1.0	U
74-97-5	Bromochloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	2.0	U
78-93-3	2-Butanone	10	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
124-48-1	Chlorodibromomethane	1.0	U
75-00-3	Chloroethane	2.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	2.0	U
95-49-8	2-Chlorotoluene	1.0	U
106-43-4	4-Chlorotoluene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
74-95-3	Dibromomethane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
142-28-9	1,3-Dichloropropane	1.0	U
590-20-7	2,2-Dichloropropane	1.0	U
563-58-6	1,1-Dichloropropene	1.0	U
10061-01-5	cis-1,3-Dichloropropene	0.5	U

7/25/00 03:54 PM

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-4

Report No : 23414

Client Name : Tighe & Bond, Inc. V1084

STL Sample Number : 152129

Project Name : Bobs Sunoco

Lab File ID : V39308

Matrix : Groundwater

Date Collected : 7/12/00

Sample Wt/Vol : 25 mL

Date Received : 7/13/00

% Solid :

Date Analyzed : 7/21/00

Dilution Factor : 1

By : GJB

CAS NO	Compound	Quantitation Limit	Concentration
		ug/L	ug/L
10061-02-6	trans-1,3-Dichloropropene	0.5	U
100-41-4	Ethylbenzene	1.0	U
106-93-4	Ethylenedibromide	1.0	U
75-69-4	Fluorotrichloromethane	1.0	U
591-78-6	2-Hexanone	10	U
87-68-3	Hexachlorobutadiene	0.6	U
98-82-8	Isopropylbenzene	1.0	U
108-10-1	4-Methyl-2-pentanone	10	U
75-09-2	Methylene chloride	1.0	U
1634-04-4	Methyl-t-butylether	1.0	0.60 J
104-51-8	n-Butylbenzene	1.0	U
103-65-1	n-Propylbenzene	1.0	U
91-20-3	Naphthalene	5.0	U
108-38-3/106-42	m+p-Xylene	1.0	U
99-87-6	p-Isopropyltoluene	1.0	U
95-47-6	o-Xylene	1.0	U
135-98-8	sec-Butylbenzene	1.0	U
100-42-5	Styrene	1.0	U
98-06-6	tert-Butylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
108-88-3	Toluene	1.0	U
87-61-6	1,2,3-Trichlorobenzene	1.0	U
120-82-1	1,2,4-Trichlorobenzene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
95-63-6	1,2,4-Trimethylbenzene	1.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-4
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Groundwater
Sample Wt/Vol : 25 mL
% Solid :
Dilution Factor : 1

Report No : 23414
STL Sample Number : 152129
Lab File ID : V39308
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/21/00
By : GJB

CAS NO	Compound	Quantitation Limit	Concentration
		ug/L	ug/L
75-01-4	Vinyl chloride	2.0	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-6
 Client Name : Tighe & Bond, Inc. V1084
 Project Name : Bobs Sunoco
 Matrix : Groundwater
 Sample Wt/Vol : 25mL
 % Solid :
 Dilution Factor : 100

Report No : 23414
 STL Sample Number : 152130
 Lab File ID : V39312
 Date Collected : 7/12/00
 Date Received : 7/13/00
 Date Analyzed : 7/22/00
 By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	1,000	U
108-86-1	Bromobenzene	100	U
71-43-2	Benzene	100	200
75-27-4	Bromodichloromethane	100	U
74-97-5	Bromochloromethane	100	U
75-25-2	Bromoform	100	U
74-83-9	Bromomethane	200	U
78-93-3	2-Butanone	1,000	U
56-23-5	Carbon tetrachloride	100	U
108-90-7	Chlorobenzene	100	U
124-48-1	Chlorodibromomethane	100	U
75-00-3	Chloroethane	200	U
67-66-3	Chloroform	100	U
74-87-3	Chloromethane	200	U
95-49-8	2-Chlorotoluene	100	U
106-43-4	4-Chlorotoluene	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
156-60-5	trans-1,2-Dichloroethene	100	U
74-95-3	Dibromomethane	100	U
96-12-8	1,2-Dibromo-3-chloropropane	100	U
95-50-1	1,2-Dichlorobenzene	100	U
541-73-1	1,3-Dichlorobenzene	100	U
106-46-7	1,4-Dichlorobenzene	100	U
75-34-3	1,1-Dichloroethane	100	U
107-06-2	1,2-Dichloroethane	100	U
75-35-4	1,1-Dichloroethene	100	U
78-87-5	1,2-Dichloropropane	100	U
142-28-9	1,3-Dichloropropane	100	U
590-20-7	2,2-Dichloropropane	100	U
563-58-6	1,1-Dichloropropene	100	U
10061-01-5	cis-1,3-Dichloropropene	50	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-6

Report No : 23414

Client Name : Tighe & Bond, Inc. V1084

STL Sample Number : 152130

Project Name : Bobs Sunoco

Lab File ID : V39312

Matrix : Groundwater

Date Collected : 7/12/00

Sample Wt/Vol : 25mL

Date Received : 7/13/00

% Solid :

Date Analyzed : 7/22/00

Dilution Factor : 100

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
10061-02-6	trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	100	1500
106-93-4	Ethylenedibromide	100	U
75-69-4	Fluorotrichloromethane	100	U
591-78-6	2-Hexanone	1,000	U
87-68-3	Hexachlorobutadiene	60	U
98-82-8	Isopropylbenzene	100	U
108-10-1	4-Methyl-2-pentanone	1,000	U
75-09-2	Methylene chloride	100	U
1634-04-4	Methyl-t-butylether	100	51 J
104-51-8	n-Butylbenzene	100	U
103-65-1	n-Propylbenzene	100	100
91-20-3	Naphthalene	500	U
108-38-3/106-42	m+p-Xylene	100	7300
99-87-6	p-Isopropyltoluene	100	U
95-47-6	o-Xylene	100	1400
135-98-8	sec-Butylbenzene	100	U
100-42-5	Styrene	100	U
98-06-6	tert-Butylbenzene	100	U
127-18-4	Tetrachloroethene	100	U
630-20-6	1,1,1,2-Tetrachloroethane	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	1.0	60.6.
87-61-6	1,2,3-Trichlorobenzene	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U
71-55-6	1,1,1-Trichloroethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
79-01-6	Trichloroethene	100	U
96-18-4	1,2,3-Trichloropropane	100	U
95-63-6	1,2,4-Trimethylbenzene	100	2500
108-67-8	1,3,5-Trimethylbenzene	100	680

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : MW-6

Report No : 23414

Client Name : Tighe & Bond, Inc. V1084

STL Sample Number : 152130

Project Name : Bobs Sunoco

Lab File ID : V39312

Matrix : Groundwater

Date Collected : 7/12/00

Sample Wt/Vol : 25mL

Date Received : 7/13/00

% Solid :

Date Analyzed : 7/22/00

Dilution Factor : 100

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
75-01-4	Vinyl chloride	200	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : TB-1

Client Name : Tighe & Bond, Inc. V1084

Project Name : Bobs Sunoco

Matrix : Other

Sample Wt/Vol : 25 mL

% Solid :

Dilution Factor : 1

Report No : 23414

STL Sample Number : 152131

Lab File ID : V39264

Date Collected : 7/12/00

Date Received : 7/13/00

Date Analyzed : 7/21/00

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
67-64-1	Acetone	10	U
108-86-1	Bromobenzene	1.0	U
71-43-2	Benzene	1.0	U
75-27-4	Bromodichloromethane	1.0	U
74-97-5	Bromochloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	2.0	U
78-93-3	2-Butanone	10	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
124-48-1	Chlorodibromomethane	1.0	U
75-00-3	Chloroethane	2.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	2.0	U
95-49-8	2-Chlorotoluene	1.0	U
106-43-4	4-Chlorotoluene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
74-95-3	Dibromomethane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
142-28-9	1,3-Dichloropropane	1.0	U
590-20-7	2,2-Dichloropropane	1.0	U
563-58-6	1,1-Dichloropropene	1.0	U
10061-01-5	cis-1,3-Dichloropropene	0.5	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : TB-1

Report No : 23414

Client Name : Tighe & Bond, Inc. V1084

STL Sample Number : 152131

Project Name : Bobs Sunoco

Lab File ID : V39264

Matrix : Other

Date Collected : 7/12/00

Sample Wt/Vol : 25 mL

Date Received : 7/13/00

% Solid :

Date Analyzed : 7/21/00

Dilution Factor : 1

By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
10061-02-6	trans-1,3-Dichloropropene	0.5	U
100-41-4	Ethylbenzene	1.0	U
106-93-4	Ethylenedibromide	1.0	U
75-69-4	Fluorotrichloromethane	1.0	U
591-78-6	2-Hexanone	10	U
87-68-3	Hexachlorobutadiene	0.6	U
98-82-8	Isopropylbenzene	1.0	U
108-10-1	4-Methyl-2-pentanone	10	U
75-09-2	Methylene chloride	1.0	U
1634-04-4	Methyl-t-butylether	1.0	U
104-51-8	n-Butylbenzene	1.0	U
103-65-1	n-Propylbenzene	1.0	U
91-20-3	Naphthalene	5.0	U
108-38-3/106-42	m+p-Xylene	1.0	U
99-87-6	p-Isopropyltoluene	1.0	U
95-47-6	o-Xylene	1.0	U
135-98-8	sec-Butylbenzene	1.0	U
100-42-5	Styrene	1.0	U
98-06-6	tert-Butylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
108-88-3	Toluene	1.0	U
87-61-6	1,2,3-Trichlorobenzene	1.0	U
120-82-1	1,2,4-Trichlorobenzene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
95-63-6	1,2,4-Trimethylbenzene	1.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	U

Volatile Organics Analysis Data Sheet

SW8468260B

Client ID : TB-1
Client Name : Tighe & Bond, Inc. V1084
Project Name : Bobs Sunoco
Matrix : Other
Sample Wt/Vol : 25 mL
% Solid :
Dilution Factor : 1

Report No : 23414
STL Sample Number : 152131
Lab File ID : V39264
Date Collected : 7/12/00
Date Received : 7/13/00
Date Analyzed : 7/21/00
By : GJB

CAS NO	Compound	Quantitation Limit ug/L	Concentration ug/L
75-01-4	Vinyl chloride	2.0	U

Severn Trent Laboratory

Chain of Custody Form



•53 Southampton Rd
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: TIGHE & BOND Job#: V-1084 Job# 23414 Quote# _____
Address: 75 VILLAGE SQ Project Manager: MAH Shaded areas for office use
BELLOWS FALLS, VT Work ID: Bob's SUNOCO Analysis Requested
Phone: (802) 463-2200 Fax: (802) 463-1188 Contact: Tom RIGLEY Check analysis and specify method
and analytes in comments section
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define

Requested Turn Around Time
15 Business Day _____ Rush _____
10 Business Day _____ Other _____

Regulatory Classification - Please Specify
NPDES _____ Drinking Water _____ MCP Other _____
RCRA _____ MCP GW1 _____ Other _____

PO# V-1084
Comments
(Special Instructions)

① EPA METHOD
8260

② EPA METHOD
8015M(GRO)

Sample Type Codes				Preservative																			
WW Wellwater	W-Wastewater	SW-Surfacewater	LW-Labwater	Plastic (P) or Glass (G)	NaHSO4/NaOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	EPH	VPH	DRO/GRO (circle)	Oil & Grease	Metals	General Chemistry	Bacteriological	Other
RW-Raw Water	GW-Groundwater	PW-Public Water	SO-Soil	# Containers																			
S-Solid	SL-Sludge	O-Oil	A-Air	Z-Other																			
Sample ID	Sample Type	Date	Grab	Comp.																			
Use one line per container For volatiles-one line/analysis		Time Collected																					
MW-1	GW	7-12-00 6/1809	X	5	G			X		X			①					②					
MW-2	GW	7-12-00 1730	X	5	G			X		X			①					②					
MW-3	GW	7-12-00 1738	X	5	G			X		X			①					②					
MW-4	GW	7-12-00 1747	X	5	G			X		X			①					②					
MW-6	GW	7-12-00 1758	X	5	G				Y	Y			①					②					
TB-1	Z			1				X		X			①										
TB-2	Z			1				X		Y								②					

Sampled by (print): Tom RIGLEY Signature: [Signature]
Relinquished by: [Signature] Date: 7-13-00 Time: 1230 Received by: [Signature] Date: 7-13-00 Time: 1330
Relinquished by: [Signature] Date: 7-13-00 Time: 1400 Received by: [Signature] Date: 7/13/00 Time: 1420
Method of shipment: _____ Laboratory: _____

Cooler #: _____
Temp. @ receipt: _____
Preservation/pH checked
By: _____ Date: _____